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ABSTRACT

This study investigated social interactions with peers on the part of 4-year-olds who were playing with a computer. Subjects were 18 preschoolers whose interactions were videotaped while they played with a computer for eight 45-minute sessions. Composition, initiation, and form of interaction were coded. Observations about the composition of interaction indicated that 55% of the children's time at the computer was spent with a peer, 25% was spent with a teacher, and 20% was spent alone. Observations of initiation of interaction indicated that 60% of the time the interaction was self-initiated, 36% of the time it was peer-initiated, and 4% of the time it was teacher-initiated. Observations of form of interaction indicated that 88% of the interactions consisted of sharing use of the computer by taking turns, and 12% consisted of doing, showing, and explaining to a peer. These data support the hypotheses of the study. Results indicate that when children play with a computer in the natural setting of a preschool, they have extensive social interaction with their peers. Appended are 37 references and related materials. (Author/GLR)

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4 YEAR OLD CHILDREN'S PEER INTERACTIONS WHEN PLAYING WITH A COMPUTER

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Abstract

This study investigated 4-year-old children's peer interactions while they were playing at a computer. Subjects were 18 preschool children whose interactions were videotaped during 8 45-minutes sessions during self selected activity time. Composition of interaction, initiation of interaction and form of interaction were coded by an observer. The observation about the composition of interaction indicated that 55% of the children's time at the computer was spent with peer, 25% of time with a teacher and 20% of time alone. The observation of initiation of interaction indicated that 60% of time was initiated by themselves, 36% of time by peer, and only 4% of time by a teacher. The observation of form of interaction indicated that 88% of interaction consisted of actively sharing use of computer by taking turns. The remaining 12% of interaction consisted of doing, showing and explaining towards peer. Investigator's observation confirms that when children play with a computer in the natural setting of a preschool they have extensive social interaction with their peers.

Review of Literature

Introduction

This study is being conducted to observe 4-year old children's peer interaction in a preschool classroom.

The use of computers in preschool programs is an issue which concerns many teachers. There are several opinions related to young children's use of microcomputers. Barnes and Hill (1983) have expressed serious reservations about the introduction of computers in the early childhood years. They are concerned that computer education would lead to isolation, diminished social interaction, and deficiencies in language. Additionally, Brady and Hill (1984) are concerned that children must reach the stage of concrete operations before they are ready to work with computers.

On the other hand, there is some evidence of socialization and interaction as children share their discoveries and give help to others (Ziaika, 1983; Muller, 1983; Taylor, 1983; Borgh & Dickson, 1986; Shade, Nida, Lipinski & Watson, 1986; Clements & Nastasi, 1986: Paris & Morris, 1985). The computer can also help children with fine motor coordination, language development, memory patterns, and serve as an aid in thinking and problem solving (Karoff, 1983; Bowman, 1983; Muller & Perlmutter, 1985; Tan, 1985; Johnston, 1987; Anselmo & Zinck, 1987; Clements, 1987; Underwood & McCaffrey, 1990). In addition, discovery-oriented child-computer environments have numerous potential uses such as modeling concepts, exposing the

processes which are not available in all their facets to the perception of young children, providing intrinsic motivation (Shade, 1987).

As computers become common in early childhood classrooms, educators need to determine whether computers can facilitate social, emotional, cognitive, language and physical development. However this project is limited to focus only on one aspect of social development, namely, social interaction between children when playing with a computer.

Research Review

This review is divided into three sections; 1) social interactions, 2) Factors influencing peer interactions when playing with a computer, and 3) coding scheme.

The first section describes several researcher's opinions based on their research. Next factors influencing peer interactions when playing with a computer will be discussed. Factors influencing peer interactions include a discussions of the following variables: a) cognitive ability, b) age, c) sex, d) influence of teacher, e) influence of peers f) characteristics of software, and g) number of computers. Thus these factors focus on variables which are characteristics of children, characteristics of others around children, and characteristic of computer itself.

Next the investigator discusses the four coding schemes and the reasons to choose one of the coding scheme for this study. Research

question and hypothesis are stated after completing the discussion of the research reviews.

Social Interactions

Several reports suggest that microcomputer usage fosters social interaction among children (Borgh et al., 1986; Shade, et al., 1986; Clements et al., 1986). These studies have noted that children are highly attracted to the computer (Swigger, Campbell, & Swigger 1984), learn to share the microcomputer with others (Borgh et al., 1986), collaborate and teach to each other (Byrd, Killian, & Nelson, 1987; Parris et al., 1987), and prefer to work together in groups (Rosengren, Gross, & Abrams, 1985: Shade, et al., 1986; Hoover & Austin, 1986).

Muller et al. (1985) have discovered that computers stimulate social interactions and thus aid social problem solving. The children work on the computer most of time with peers, during which they often spontaneously share and instruct each other. Muller (1983) has noted that, with age-appropriate software, preschoolers are capable of interacting with a computer and working cooperatively with their peers, without the need of constant supervision by teachers.

Clement(1985) suggested that programming training can serve as a powerful tool in encouraging prosocial interaction, positive self-images, positive attitudes toward learning, and independent work habits. Researchers observe young children commenting positively

about their computer work (e.g., "I did it. I made it Work": Shade & Watson, 1988). It appears that the computer enhances both communication and self-confidence.

Social interactions when playing with the computers is next compared to social interactions during other free play activities and TV watching. Lipinski, et al., (1986) indicated that just as many social behaviors such as cooperation, helping and sharing, praise and initiating social interaction occurred around the computer as in the other play areas. Although computer novelty initially interrupted free-play activity patterns by drawing children away from traditional activities such as finger-painting and block building most activities returns to baseline levels within weeks. White (1983) found that children who worked with the microcomputer in a learning lab asks more questions and discusses their task more than they did with such as art, block and sand play in their classroom. Observing 5-year-olds, Hyson (1985) found that, in comparison to television watching, computer use produces far more active, positive, and emotionally varies facial expressions and more smiling. Hyson also has reported that children working at a computer speak more often either to each other or to observers than TV watching . They display more expressions of active interest, more joy expressions and more behaviors indicative of concentration or focused attention than television watching.

Factors influencing peer interactions

The characteristics that most distinguish preschoolers interest in using computers are as follows.

a) Cognitive Ability

The children who have cognitive competence tend to be older and they exhibit significantly higher levels of cognitive maturity. They manifest higher level of representational competence and vocabulary development and display more organized and abstract forms of free play behavior (Johnson, 1985; Hoover et al., 1986). They do not differ from less interested peers in creativity, estimates of social maturity, or social cognitive ability. Thus, there may be important cognitive underpinnings of computer involvement by preschoolers. (Johnson, 1985)

b) Age Effect.

Silvern(1989) observed children's use of the computer in a free choice environment. This observations indicated that primary users were older and more physically powerful boys. Although older children may be more interested in using computers there is little evidence that computers should not be introduced to young children. No major differences have been found by Beeson and Williams (1985) between the way computers are used by younger (under 5 year old; 45-59 month) and older preschooler (over 5 year old; 61-67 month).

c) Sex Effect

The majority of research shows that no difference between boys

and girls in the amount or type of computer use (Hoover et al., 1986; Borgh et al.,1986; Johnson, 1985).

However, a few studies have found slight differences by gender. Swigger et al. (1983) has stated that boys tends to experiment more with software, while girls follow the rules and stay within the dictates of established drill and practice programs. Lipinski et al. (1986) have reported mixed findings on sex differences, with preschool boys (average age = 4.5 years) spending significantly more time at the microcomputer in the larger classroom of 22 children and girls(average age = 4.7 years) tending to spend more time at the microcomputer in the smaller classroom of 12 children. Hence they hypothesized that large classroom's aggressive behavior discouraged girls from coming to and remaining at the microcomputer.

On the other hand, numerous researchers have reported greater male microcomputer use in eight, nine, eleven, and twelve years old (Lockheed & Frakt, 1984; Sanders, 1984; Hawkins, Sheingold, Gearhart & Berger, 1982). They found that these school boys have more access to computers, use computers more frequently and with more control, while girls never identified themselves as microcomputer experts.

Thus Lipinski, et al. (1986) and Swigger et al. (1983) feel that early use, that is, at three to four years of age by both genders may decrease the stereotyping at the later age because these children will already have defined computer use as an activity for both boys and girls.

d) Teacher Effect

Rosengren et al. (1985) have observed that when teachers provide adequate early instruction and guidance, preschool children appear to be able to use a computer in an effective manner without close supervision. Anselmo et al. (1987) have stated that teachers presence seem to be a secondary factor when compared to the age of children and their interest in the computers. They suggested that the teachers were not regularly near the computer as children became more experienced in the group setting and more independent.

However, the teachers do play a role to some degree in successful computer usage. The children are more attentive, more interested, and less frustrated when a teacher is present (Shade et al., 1986; Byad et al., 1987). In addition, the presence of the teacher further gave many children the confidence needed to explore the computer (Shade et al., 1986).

Burns, Goin, and Donlon (1990) also indicated that using computers solely as an independent activity for young child may be a mistake. They suggested that teachers need to be involved in meaningful communication with children, helping them relate the thinking processes used in the computer program to other school activities and to other facets of their lives. Thus teachers can provide children with information that will enable them to work with their peers with minimal teacher involvement.

e) Peer Effect

Silvern et al. (1985) observed children's interaction at the

computer in a free play choice station where children waiting to play demanded that two player games be played. Next they established a rotation system for using the computer where the winner of the game remains as a champion and is joined by a peer who then is a challenger. Silvern et al. (1985) had predicted that the children would get tired of this type of "champ-challenger" rotation system. But once these "champ-challenger" software computer games were used and a system for playing was established, virtually all exploration of other softwares were stopped. Therefore this study suggested that children are attracted to software which provides peer interaction and peer learning.

Swigger et al. (1984) indicated that most of children preferred to interact with the computer as a group rather than as individuals. Even when Swigger et al. (1984) made an effort to impose a rule of only one child using the computer the children disregarded it and continued to play that computer game in groups. The typical format of the group play was that one child operated the keyboard while the other children watched. Furthermore, except for the heavy users, all the children used the computer with their close friends. Although the computer did not disrupt the existing social systems(leadership and close friendship), it did reinforce established leader as well as create at least one new leader who has knowledge about the operation of the computer.

f) Software Effect

The type of software used influences children's behaviors.

Hyson (1985) reported that a drawing program tended to elicit more indicators of concentration, planning, and social engagement that a face construction and counting programs. Borgh et al. (1986) found that children's verbal statements are strongly affected by the characteristics of the software. They also indicated that programs with definite correct answers elicit verbalizations about correctness and winning, but also encourage peer teaching; open ended programs elicit more wondering and hypothesizing.

Silvern, et al. (1985) categorized 13 available games on the following attributes; number of player required (1 or 2), hardware (keyboard or game paddles), strategy required (manipulative or cognitive), and reading required(reading necessary or unnecessary in order to play). They found that the characteristics most popular software for children were two player game, paddle, manipulative, and nonreading software.

Sherman, Divine, and Johnson (1984) also studied whether preschool children had a preference for drill and practice or problem solving software. They found that regardless of sex, children spent the larger portion of their time engaged with problem solving programs.

Rosengren et al. (1985) suggested that programs which allowed children a relatively large degree of creativity or control, or allow children to interact with others, may be preferred by preschool children over more structured programs or programs designed to be used individually.

g) Number of Computers Effect

The ratio of computers to children may be a critical factor influencing social behaviors. Lipinski et al. (1986) found that when one microcomputer was introduced into the classroom of twenty-two children, there were many aggressive behaviors- shoving, pushing, jockeying for position- as vied for their turn. There was no such aggressive behavior in the room with a ratio of 1:12, compared to in the room with a ratio of 1:22. Thus, they suggest that a 1:10 ratio might ideally encourage computer use, cooperation, and equal access to girls and boys.

Coding Scheme

In this section, the investigator will discuss four coding schemes which focused on social interactions. The investigator will first introduce the coding scheme that has been chosen. Next investigator will discuss the merits, limitations, and the reasons for not selecting the other coding schemes.

The study done by Muller et al. (1985) focused on preschool children's interactions in problem-solving with computers. Observers coded each child's arrival and departures from the computer, the amount of time spent there, and social interaction.

Three categories were used to describe the composition of social interaction (i,e., the presence of partners); there were none, teacher, and peer. Three categories were also used to describe the initiation of social interaction. These were initiated

by herself or himself, by a teacher and by a peer. In addition, there were four categories to describe the form of interaction; these were sharing (turn-taking), doing (performing the action for another), showing (demonstrating the action) and explaining (describing the action).

The investigator choose this coding scheme because it seems to provide a focus on social interaction for solving social problem among preschool children. This investigator will only use social interaction coding category and not use the other categories namely child's arrival and departure from the computer and the amount of time spent on the computer, which too was a part of Muller et al., (1985) coding scheme.

Shade et al.'s study (1986) also coded child and child interactions and child's relationship with a computer. Child-child interactions were identified as (a) positioning for a turn at the computer, (b) assisting one another at the computer, (c) enforcing of rules concerning the use of computer and (d) dominating the computer station. Child-computer behaviors were labeled as (a) object aggression(hitting, banging, punching the machine), (b) defending property (trying or keep other children from using the machine), (C) key manipulations, and (d) touching the monitor.

This coding scheme regarding the category on child interaction is appropriate to this study but it is also included in coding scheme done by Muller et al. Coding categories regarding to computer manipulation is not the area of investigation in this study. Hence this investigator decided not to use Shade et al.'s

(1986) coding scheme.

The coding done by Paris et al., (1985) namely focused on children's teaching and helping their peers and teacher's teaching and helping the children. Observations were analyzed using four categories of interaction such as successful child-child , successful child-teacher; unsuccessful child-child and unsuccessful child-teacher. Successful helping and teaching means they initiates or maintains a helping episode. Unsuccessful helping and teaching means children rejects or ignores teaching and helping behaviors.

Successful and unsuccessful child-child interactions were divided into 4 categories such as (a) verbal instructions, (b) shows by demonstration, (c) child asks for help, (d) demonstration with explanation. Successful and unsuccessful teacher-child interactions were also identified as (a) Teacher prompts helping, (b) Child requests help (verbal or nonverbal), (c) verbal instructions, (d) responses to request for specific help, (e) shows by demonstration, (f) quizzing.

Paris et al. (1985) coding scheme regarding the category on child-child interaction is appropriate to this study but it is included in Muller et al. (1985) categories, namely, form of interaction and initiation of interaction. Coding categories regarding to child-teacher interaction is not related to this investigator's research question. Hence this investigator decided not to select Paris et al., coding scheme.

The purpose of the study done by Klinzing (1985) was to determine the popularity of computer stations in comparison with the

other Play activity stations. He used Parten's play classification coding system which focused on social interaction but in play context and thus was not appropriate. He also used Flanders's interaction analysis scale such as 1) praises, encourage, 2) asks questions, 3)answer questions, 4) gives information, 5) gives directions, 6) criticizing, commanding, demanding, 7) laughing or exclamation, 8) teacher initiated statement, 9) teacher responses, 10) silence.

These categories are appropriate to identify specific verbal interactions. But this study is investigating in general and not exclusively verbal interactions. Therefore, this investigator decided not to use Klinzing's coding scheme.

Thus after reviewing four coding schemes, investigator finally chose to use Muller et al's coding scheme (1985) as most appropriate for the purpose of this study.

Research Question

What is the peer interaction of 1-year-odds when playing with computer?

Hypothesis

Composition of Interaction

The highest percentage regarding the composition of social

interaction when playing with a computer would be with peers. The second highest percentage would be with teachers and the lowest percentage would be a child playing alone having no peer interaction.

Initiation of Interaction

The highest percentage regarding the initiation of social interaction when playing with a computer would be initiated by himself or herself. The second highest would be initiated by peers and the lowest percentage would be initiated by teachers.

Form of Social Interaction

The highest percentage regarding the form of interaction would be sharing. The remaining behaviors : doing or performing actions for another child; showing or demonstrating the required action for another child; explaining or telling another child the required action would be approximately the same percentage.

Method

Subjects

The subjects were 18 children (8 males and 10 females) in

preschool classroom at the Carleton Public Elementary School. The mean ages of the 18 children was 4 year and 10 months and the range was from 4.1 month to 4.11 month. They were exposed to using computers for six months before this study began.

Procedure

The children's behavior at the computer was observed for 45 minutes during self selected activity period for two days each week for four consecutive weeks, totalling to eight videotaped sessions. During these times, the children were allowed to work at the computer alone or with a group of children. Since other activities were also available, this procedure usually allowed several groups the opportunity to use the computer during the 45 minute session.

An Apple computer, a single disk drive and a standard keyboard was available in the children's classroom. There were two softwares, one on number and the other on color.

The teachers were asked to interact with the children at the computer in the same manner and to the same extent as they did when the children were engaged in other classroom activities. The teachers usually let the children play independently until they needed help either as perceived by the teacher or when children directly asked the assistance.

An observer coded the videotapes of children's social interactions at the computer. The coding scheme used for this study was designed by Muller et al. (1985) and modified by this

TABLE 1

Coding Categories

Category	Definition
Composition of Interaction	
None	No other present
Teacher	Teacher present
a) Teacher with one child	
b) Teacher with a group of children	
Peer	Peer present
Initiation of Interaction	
Self	Not preceded by request
a) Child initiates to teacher	
b) Child initiates to peer	
Teacher suggest peer interaction	Preceded by teacher request
a) child agrees to suggestion	
b) child disagrees to suggestion	
Peer	Preceded by peer request
Form of Interaction	
Sharing	Turn taking
Doing	Performing required action for another child
Showing	Demonstrating required action for another child
Explaining	Telling another child the required action

investigator as shown in Table 1. Investigator defined the end of a episode and the beginning of another episode whenever a child who was at the computer either left or joined the group.

Refer to Table 1 for coding categories. The investigator made the following revisions in Muller et al's coding scheme. The composition of interaction with a teacher was divided into two subcategories; namely the teacher is with one child and a group of children. The investigator further divided self initiation into two subcategories, namely, to initiate towards a teacher and towards a peer. The investigator also divided the teacher's initiation into two subcategories. The first subcategory is that a teacher suggests peer interaction and a child agrees. The second subcategory is that a teacher suggests peer interaction and the child disagrees. All these subcategories provide the investigator with more accurate observational data in the area of peer interactions.

Result and Discussion

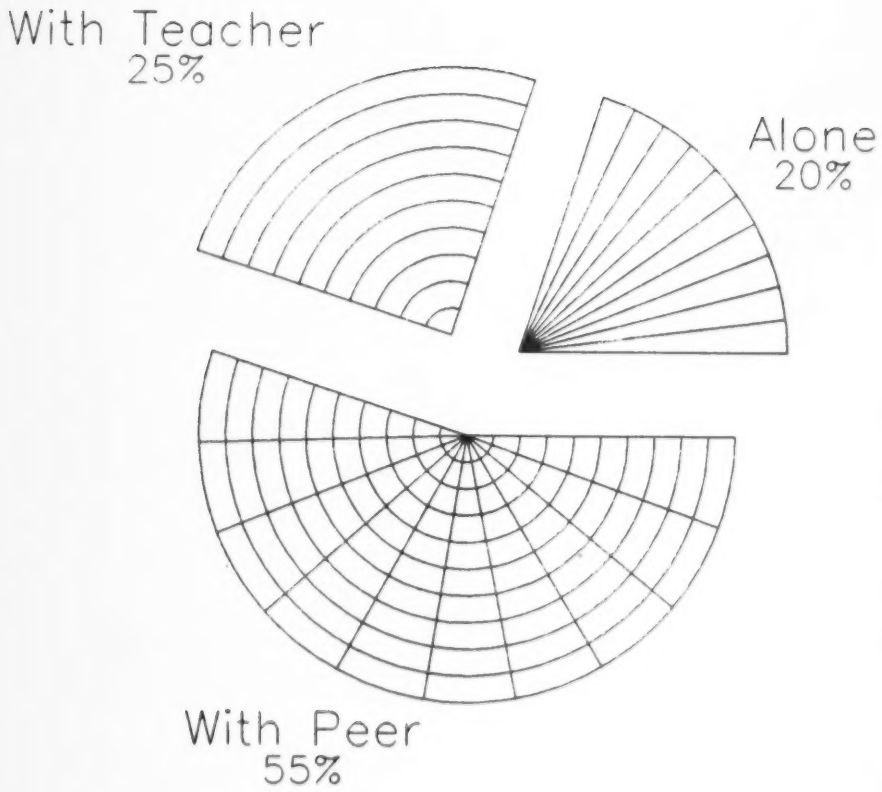
Results

Overall, 158 episodes of child computer activity were observed.

Composition of Interaction

Children seemed to prefer working at the computer with another

Figure 1. Distribution of composition of Social Interaction at Computer



individual, especially a peer. As shown in Figure 1, 55% of time they worked with peer, 25 % of time they were with a teacher, and 20% of time they were alone.

As shown in Table 2, children were present with peers 87 episodes out of 158 episodes (55%). They were present with a teacher 40 out of 158 episodes (25%) and were present alone 31 episode out of 158 episodes(20%). Composition of interaction as stated early was further analyzed to identify if a teacher was alone with one child or if a teacher was with a group of children, namely, with peers. The teacher was present with one child 9 out of 158 episodes (5.5%) and was present with a group of children 31 out of 158 episodes (19.5%). Hence the total composition of peer interaction is by combining the categories of 55% of the time when children were present with a peer in the absence of a teacher, plus 19.5% when they were interacting with their peers in the presence of the teacher. Therefore, 55% of time plus 19.5% of time is totalling to 94.5% of time children were interacting with peers.

In addition to the above mentioned quantitative data, this investigator has specific anecdotal observations on one child. She would stop playing as soon as her peer would leave her and would restart her playing on the computer as soon as her close friend joined her.

Thus all of above evidences supports the first hypothesis that the highest percentage regarding the composition of social interaction is when children are playing on a computer with peers; the second highest percentage is the composition of social

Table 2.

Frequency and percentage of Result

Social Interaction	Frequency of Observation's Result	Percentage of Result
Composition of Social Interaction		
Alone	31 out of 158	20 %
With Teacher	40 out of 158	25 %
a) one child	a) 9	a) 5.5 %
b) peer	b) 31	b) 19.5 %
With Peer	87 out of 158	55 %
Initiation of Social Interaction		
Self	523 out of 879	60 %
a) self to teacher	a) 14	2 %
b) self to peer	b) 509	58 %
Teacher suggest peer interaction	37 out of 879	4 %
a) child agrees to suggestion	a) 34	4 %
b) child disagrees to suggestion	b) 3	0 %
Peer	319 out of879	36 %
Form of Social Interaction		
Sharing	918 outof 1040	88 %
Doing	22 out of 1040	2 %
Showing	58 out of 1040	6 %
Explaining	42 out of 1040	4 %

interaction with teachers; and the lowest percentage is the composition of social interaction when a child is playing alone, having no peer interaction.

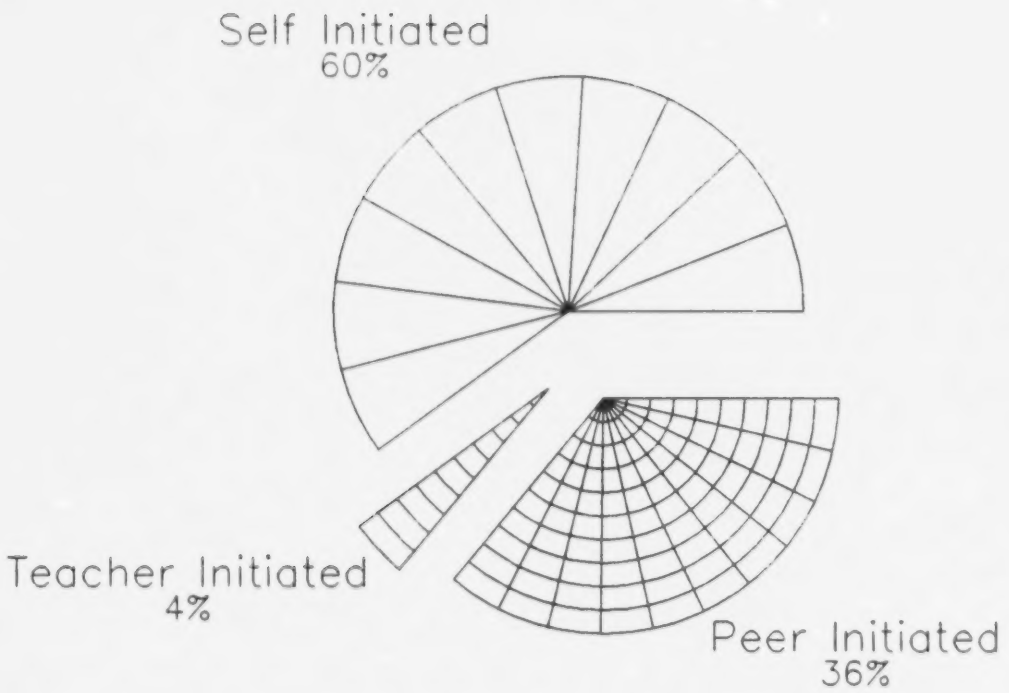
Initiation of Interaction

As shown in Figure 2, 60% of social interactions were initiated by children themselves, 36% of social interactions were initiated by a peer, and only 1% of social interactions were initiated by a teacher.

As shown in Table 2, social interaction were initiated 523 out of 879 times (60%) by the child himself or herself. They were initiated by a peer 319 out of 879 times (36%) and were initiated by a teacher 37 out of 879 times (4%). The social interactions specifically initiated by themselves towards a peer were 509 out of 523 times (58%). The remaining social interactions that were initiated by themselves were towards a teacher, i.e., 14 out of 523 times (2%) whenever a child needed help to use the computer. 34 out of 37 times (4%) a teacher suggested peer interactions and the children agreed to the teacher's suggestions to interact with a peer. Only 3 out of 37 times (0%) when a teacher suggested peer interactions the children disagreed with the teacher's suggestion to interact with a peer. This 3 out of 879 times came to be fraction of percentage. Therefore this was rounded by 0%.

Hence 58% of the time children interacted with peers based on their own initiations. Additionally 36% of the time they interacted

Figure 2. Distribution of Initiation of Social Interaction at Computer



with peers as a result of peer initiations and 4% of time they interacted with peers as a result of teacher initiations. Therefore this totals to 98% of the time children interacted with peers.

This data thus supports the second hypothesis that; the highest percentage of the initiation of social interaction when playing with a computer is by himself or herself. The second highest percentage of initiation of social interaction is by a peer and the lowest percentage of initiation of social interaction is by a teacher.

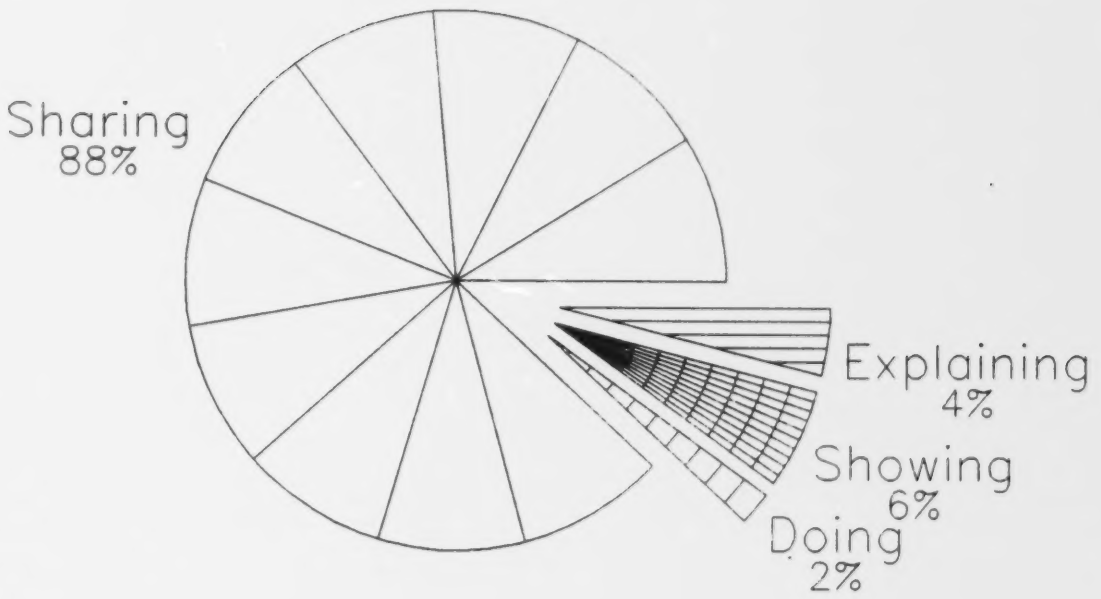
Form of Interaction

As shown in Figure 3, 88% of the peer interactions consisted of actively sharing the use of the computer by taking turns. 6% of the peer interactions consisted of one child showing or demonstrating the required actions for another child. 1% of peer interactions consisted of one child explaining or telling another child the required actions. 2% of the peer interactions consisted of one child doing or performing the required actions for another child on the computer.

As seen in Table 2, children were sharing 918 out of 1040 times (88%), showing 58 out of 1040 times (6%), explaining 42 out of 1040 times (4%), doing 22 out of 1040 times(2%).

The investigator's informal anecdotal observation also supports the above quantitative data that there was an extremely low frequency of antisocial behavior. However this highly infrequent antisocial behavior could not be captured on this coding scheme.

Figure 3. Distribution of Form of Social Interaction at Computer



The investigator's impressions are that the children were predominantly displaying prosocial behavior during the eight observation sessions.

Therefore, the data on form of interaction supports the third hypothesis that ; the highest percentage regarding the form of interaction was sharing. The remaining form of interactions, namely, doing, showing, and explaining are approximately the same percentage.

Comparison of social interaction

Next, the investigator compares the findings of this study with the results of Muller et al., study(1985) in Table 3. As Seen in Table 3, the findings of Muller et al. study were replicated by this investigator. This investigator's results are highly similar to the findings of Muller et al. (1985).

Composition of Interaction

Muller et al. (1985) and this investigator's findings report the highest percentage regarding the composition of social interaction was with peers, followed by social interactions with teachers, and the lowest percentage of social interactions were alone. Hence this study supports findings done by Muller et al. (1985).

TABLE 3

Comparison of Social Interaction Between Muller and Perlmutter's Study and Investigator's Finding

Social Interaction	Result done by Muller & Perlmutter	Result done by Investigator
Composition of Social Interaction		
Alone	11 %	20 %
With Teacher	28 %	25 %
a) one child		a) 5.5 %
b) peer		b) 19.5 %
With Peer	63 %	55 %
Initiation of Social Interaction		
Self	78 %	60 %
a) self to teacher		a) 2 %
b) self to peer		b) 58 %
Teacher suggest peer interaction	3 %	4 %
a) child agrees to suggestion		a) 4 %
b) child disagrees to suggestion		b) 0 %
Peer	19 %	36 %
Form of Social Interaction		
Sharing	70 %	88 %
Doing	10 %	2 %
Showing	9 %	6 %
Explaining	11 %	4 %

Initiation of Interaction

As Shown in Table 3, Muller et al.,(1985) and this investigator's findings report that the highest percentage of initiation were initiated by themselves. The second highest percentage of initiation were initiated by the peers and the lowest percentage of initiation were initiated by the teacher. Hence this study supports findings done by Muller et al,. (1985)

Form of social Interaction

As shown in Table 3, Muller et al.,(1985) and this investigator's finding's report that sharing was the highest form of social interactions. The remaining behaviors, namely, doing, showing, and explaining were of approximate equal percentage in both Muller et al., and this investigators study. Hence this study supports findings done by Muller et al., (1985).

Conclusion

Thus the result of this investigation indicates that microcomputers will not lead to social isolation, as feared by Barnes et al. (1983), nor will microcomputers have deleterious consequences for the social life of the preschool classroom.

To summarize, the investigator confirms that when children play

with a computer in the natural setting of a preschool classroom they have extensive social interactions with peers. These social interactions are very critical in developing peer learning and providing social contexts for learning. This investigator concludes that computer can provide a rich experiences and a social context for peer interaction thereby enhance preschool environment.

References

Anselmo, S., & Zinck, R. A. (1987). Computers for young children? Perhaps. Young Children, 22-27

Amstrong, N., & Margot, C. (1983). Computers for the preschool: Beyond the basics (Report No. PS 014132). CA: University of California. (ERIC Document Reproduction Service No. ED 250 027)

Barnes, B.j, & Hill, S. (1983). Should young children work with microcomputers-Logo before Lego? The computing Teacher, 10, 10-14.

Beeson, B.S., & Williams, R. A. (1985). The effects of gender and age on preschool children's choice of the computer as a child-selected activity. Journal of the American society for Information Science 36, 339-341.

Borgh, K., & Dickson, W. P. (1986). Two preschoolers sharing one microcomputer; Creating prosicial behavior with hardware and software. In P.F. Campbell & G. G. Fein (Eds.), Young children and microcomputers (PP.33-44). Reston Publishing, 114800 Sunset Hills Rd., Reston, VA 22090.

Bowman, B.(1983). Do computers have a place in preschool? (ERIC Publication, ED 321 504)

Brady, E. H., & Hill, S. (1984). Research in review. Young children and microcomputers: Research issues and

directions. Young Children, 39(3), 49-61.

Burns, M.S., Goin, L., & Donlon, J.T. (1990). A computer in my room. Young Children, 62-67.

Byrd, D., Killian, J. E., & Nelson, J. N. (1987). Is there a role for computers in childhood Program: A Naturalistic Study (Report No. PS 016943), Houston, TX: Association of Teacher Educators Annual Meeting. (ERIC Document Reproduction Service No. ED 288 621)

Campbell, P. F., Schwartz, S.S. (1986). Microcomputers in the preschool, children, parents, and teachers. In P,f, Campbell & G. G. Fein (Eds), Young children and microcomputers (pp.46-59). Reston Publishing, 11480 Sunset Hills Rd., Reston, VA 22090.

Clements, D. H. (1985) Research on Logo in education: Is the turtle slow but steady, or not even in the race, Computers in the School, 2, 55-71.

Clements, D. H. (1987). Computers and young children; A review of research. Young Children, 43(1) 34-44.

Clememts, D.H., & Nastasi, B.K.(1985). Effects of computer environments on social-emotional development: Logo and computer-assisted instruction. Computers in the Schools, 2(2-3), 11-31

Hawkins, J., Sheingold,K., Gearhart, M., & Berger, J. (1982). Microcomputers in schools: Impact on the social life of elementary classrooms, Journal of Applied Developmental Psychology, 3(4), 361-373.

Hoover, J., & Austin, A.M. (1986). A Comparison of traditional preschool and computer play from a social/cognitive perspective. (ERIC Document Reproduction Service No. ED 270 220)

Hyson, M. C. (1985). Emotions and the microcomputer. An Exploratory study of young children's responses. Computers in Human Behavior, 1, 143-152.

Johnston, V. M.(1987) Attitudes towards microcomputers in learning; Pupils and software for language development. Educational Research 29(1) 47-55.

Johnson, J.E. (1985) Characteristics of preschoolers interested in microcomputers. Journal of educational Research, 78(5), 299-305.

Karoff, P.(1983) Computerized head start. Teaching, Learning, computing, 48-50.

Klinzing, D. G.(1985). A Study of the behavior of children in a preschool equipped with computers. (ERIC Document Reproduction Service. No. ED 255 520)

Lipinski, J.M., Nida, R.E., shade, D.d., & Watson, J. A. (1986). The effect of microcomputers on young children: An examination of free-play choices, sex differences,and social interactions. Journal of Educational Computing Research, 2, !47-168.

Muller,A. (1983) Preschoolers at the computers. Commodore; The Microcomputer magazine, 25, 86-88.

Muller, A.A., & Perlmutter, M. (1985). Preschool

children's problem-solving interactions at computers and Jigsaw puzzles. Journal of Applied Developmental Psychology, 6, 173-186.

Paris, C.L., & Morris, S.K. (1985). The computer in the early childhood classroom: Peer helping and peer teaching (Report No. PS 015123). College park, MD: The Microworld for Young Children Conference. (ERIC Document Reproduction Service No. ED 257 555)

Rosengran, K. S., Gross, D., Abraham A. F., & Perlmutter, M. (1985). An observational study of preschool children's computing activity. (ERIC Document Reproduction service No. ED 264 953)

Shade, D.D., Nida, R.E., Lipinski, J.M., and Watson, J.A. (1986). Microcomputers and preschoolers: Working together in a classroom setting. Computers in the School, 53-61.

Shade, D. D. & Watson.(1988). Microworlds, mother teaching behavior and concept formation in the very young child. In J. T. Pardeck & J. W. Murphy (Eds.), Microcomputers in Early Childhood Education.

Shade, D.D., & Watson, J.A. (1988). Microcomputers in preschool environments: Answers to questions, theoretical guidance and future directions (Report No. PS 017612). Newark, DE: University of Delaware. (ERIC Document Reproduction Service No. ED 299 060)

Sherman, J., Divine, K.P., & Johnson, B.(1985). An

analysis of computer software preferences of preschool children. Educational Technology, PP. 39-41.

Silvern, S.B., Williamson, P.A., & Countermine, T.M. (1988). Young children's interaction with a microcomputer. In J. T. Pardeck & J. W. Murphy (Eds.), Microcomputers in Early Childhood Education.

Swigger, K.M., Campbell, J., & Swigger, B.K. (1983). Preschool children's preferences of different types of CAI programs. Educational Computer Magazine, 38-40.

Swigger, K. M., Campbell, J., & Swigger, B.K.(1984). Social patterns and computer use among preschool children. AEDS Journal, 17, 35-41.

Tan, L.E. (1985) Computers in preschool education. Early Child Development and Care. 19, 319-336

Taylor, H. L. (1983). Microcomputers in the early childhood classroom (Report No. PC-830-444). Lynwood, Washington DC: Edmonds Community College. (ERIC Document Reproduction Service No. ED 234 845)

Underwood, G. & McCaffrey, M. (1990) Gender differences in a cooperative computer-based language task. Educational Research, 32(1) 44-49

White, M.A. (1983) Synthesis of research on electronic learning, Educational Leadership, 40(8), 13-15.

Ziajka, A. (1983) Microcomputers in early childhood education? A first look. Young Children 38, 61-67.

Appendix A

Example of Summary Chart

Session ; 3 - 14 - 91

Number of Play Episodes : 21

Composition of Social Interaction

1) Alone ; 2

2) With Teacher ;

a) Teacher presents to one child

b) Teacher presents to group of children

a) b) 4 Total; 4

3) Peer : 15

Initiation of Social Interaction

1) Self

a) Child initiates social interaction to teacher

b) Child initiates social interaction to peer

a) 2 b) 149 Total; 151

2) Teacher suggests peer interaction.

a) Children agree

b) Children disagree

a) 4 b) Total; 4

3) Peer : 48

Form of Social Interaction

1) Sharing ; 38

2) Doing ; 2

3) Showing ; 13

4) Explaining ; 12

Appendix B

Scoring Sheet

Composition of S. I.								
Alone		V						
Teacher: one child								
group			V		V		V	
With peer	V			V		V		V
Initiation of S. I.								
Self: to teacher					V			V
to peer	VVVVV V			V		VVVVV VVVV		VVVVV VVVVV VVVVV VVVVV VVVVV V VVVVV VVVVV VVVVV VVVVV
Teacher: a			V		V		V	
b								
Peer	VVV					VVVV VV		VVVVV VVVVV VVVV VVVV
Form of S. I.								
Sharing	VVVV		V	VV		VVVV V	V	VVVVV VVVV
Doing								V
Showing								VVVV VVV
Explaining								V

Composition of S. I.								
Alone								
Teacher: one child								
group		√						
With peer	√		√	√	√	√	√	√
Initiation of S. I.								
Self: to teacher								
to peer	√√√√√ √√√√√ √√		√√√√√ √	√√√√√ √	√	√√√√√ √√√√√ √√	√√√√ √√√√ √	√
Teacher: a		√						
b								
Peer	√			√√		√√√√	√√√√	
Form of S. I.								
Sharing	√√		√√		√√	√√√	√	√
Doing								
Showing	√	√		√		√		
Explaining	√√√√ √√			√				

Composition of S. I.								
Alone		V						
Teacher: one child								
group								
With peer	V		V	V	V			
Initiation of S. I.								
Self: to teacher								
to peer	V		VVVVV	VVVVV VVVVV VVVVV VVVVV	VVVVV V			
Teacher: a								
b								
Peer			V	VVVV	VVV			
Form of S. I.								
Sharing				VV	VV			
Doing			V					
Showing			V					
Explaining	V			V	V			